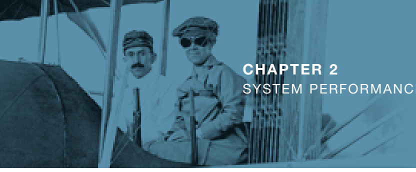
CHAPTER 2 SYSTEM PERFORMANCE GOALS AND MEASUREMENTS

"Aviation is proof that given the will, we have the capacity to achieve the impossible."

~ Eddie Rickenbacker



2 System Performance Goals and Measurements

Through extensive planning, the establishment of clear objectives and measurable goals, restructuring, and a commitment to improving customer service, the FAA continues to improve its operational efficiency. The various plans described in the following section highlight the capacity-related initiatives underway. For further information about the FAA's Air Traffic Organization, the Flight Plan or the Operational Evolution Plan (OEP), refer to the web site at www.faa.gov.

In addition to the plans briefly described in the following section, the FAA, under Department of Transportation (DOT) leadership, is committed to working with other government agencies to develop a long-range national plan for our future aviation system. FAA's Joint Planning Office is spearheading this effort with participation from the National Aeronautical and Space Administration, Department of Defense, Department of Homeland Security, and Department of Commerce. Targeted for completion by the year 2025, the plan will lay out a concept of operations, focus research funding, and guide the transformation of air traffic management and our ground-based infrastructure to meet the needs of the 21st century.

2.1 The Air Traffic Organization

In November 2003, the FAA announced its plan for the creation of its Air Traffic Organization, which is the culmination of a decades-long attempt to improve the delivery of air traffic services by adopting best business-like practices. The ATO is an operating entity within the FAA that consolidates the functions previously performed by Air Traffic Services (ATS), Research and Acquisition (ARA), and the Free Flight Program Office (AOZ).

The ATO is headed by the Chief Operating Officer (COO), who reports directly to the FAA Administrator and is a member of the FAA's senior management team. The Secretary of Transportation and the FAA Administrator retain responsibility for general safety and policymaking functions. Beginning in January 2004, the ATO organization will be implemented in three phases, establishing the management information framework, including a cost-accounting system; developing and implementing meaningful performance measures that reflect the needs of FAA customers; and putting a system in place that connects the major top-level goals to daily operation. ATO supports the FAA's long-term strategic plans, and ATO has prime responsibility for achieving many of the goals and objectives of the current FAA Flight Plan.

2.2 The FAA Flight Plan 2004-2008

The FAA Flight Plan for 2004-2008 summarizes the Agency's short-term strategies for achieving success, and monitoring how well it is meeting the expectations of its customers and other stakeholders of the National Airspace System (NAS).

The enormous task of transforming the aviation system to meet the challenges in the second century of powered flight require an ambitious plan engaging both the FAA and the aviation community. The FAA's ability to improve safety and expand capacity in the U.S. and in the international arena depends in part on the willingness of authorities on the state, local, and international levels to cooperate with the Agency in such areas as building new airports, expanding runways, or implementing new technologies.

The Plan contains four goal areas and the programs and initiatives to meet them. The goal areas include: Increased Safety, Greater Capacity, International Leadership, and Organizational Excellence. The Flight Plan provides an overview of all aspects of FAA activity, with an emphasis on operations. The OEP identifies the responsibilities and duties of the key players in the industry, each of whom must make their own contributions in order to increase capacity and efficiency of the NAS.

2.3 The Operational Evolution Plan (OEP)

The OEP is the FAA's rolling ten-year plan to increase the capacity and efficiency of the National Airspace System while enhancing safety and security. Introduced in June 2001, the OEP reflects the ongoing close collaboration among the entire aviation community, which includes passenger and cargo carriers, airports, manufacturers, general aviation, the Department of Defense, the National Weather Service, and the National Aeronautics and Space Administration. The OEP and Flight Plan are discussed in the following section, relative to system capacity.

2.3.1 The Greater Capacity Goal of the OEP

Like safety, additional capacity is also a necessity. The efficient growth of air travel requires growth in aviation capacity. Demand with all its economic benefits will only revive and increase if passengers can move quickly and efficiently through the system, and airline operations can thrive only if they are as streamlined as possible. The greater capacity goal is supported by the FAA, working with local governments and airspace users to provide a national system that meet or exceeds demand. As the OEP is a capacity enhancement plan, the metrics contained in the plan relate to accessibility (capacity and throughput) and efficiency. The OEP Metrics Plan uses effective capacity (measuring the theoretical volume of traffic that can be handled at a fixed level of delay) to capture the synergy between capacity and demand changes. This goal will be attained through a series of objectives:

- Increase airport capacity to provide a system that meets or exceeds air traffic demand.
- Improve efficient air traffic flow over land and sea.
- Increase or improve airspace capacity in the eight major metropolitan areas and corridors that most affect total system delay: New York, Philadelphia, Boston, Chicago, Washington/Baltimore, Atlanta, LA Basin, and the San Francisco Bay Area.
- Increase on-time performance of scheduled carriers.

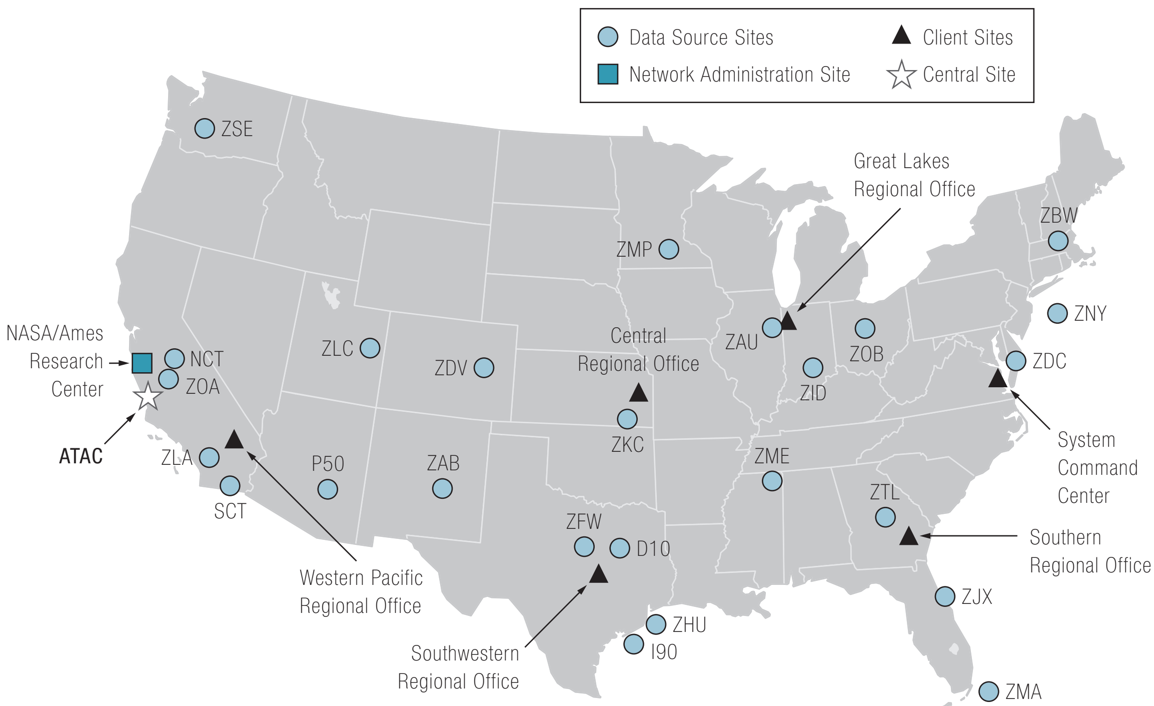
Taking into account the impact of the global economy, the war in Iraq and Severe Acute Respiratory Syndrome (SARS) on US air travel, revised industry forecasts now indicate that demand will not rebound until 2005 at the earliest. Thus, the FAA is engaged in a complex and thorough planning process to ensure that the NAS will be able to accommodate more traffic while easing delays, and increase safety and security while addressing noise and air quality.

2.4 Performance Data Analysis and Reporting System (PDARS)

The previous section discussed performance measures that are used by both government and industry analysts to evaluate performance of the NAS. The FAA is also developing some measurement tools that are more closely tailored to the daily operation of the air traffic control system. The Performance Data Analysis and Reporting System (PDARS) assist ATC facility managers in measuring the performance of their facilities. The FAA's Office of System Capacity and NASA's Aviation Safety Program developed it collaboratively.

PDARS extracts radar data from the Host or ARTS computers and processes and distributes it to FAA facilities via a secure Wide Area Network (WAN). Data can be analyzed to uncover the root causes of impediments to NAS operations. PDARS provides the analyst with a set of interactive tools that can access the distributed database and measure, analyze, and report system performance. PDARS also maintains an archive of historical data, which supports trend analysis, and before and after comparisons. Operational performance data can be depicted both numerically and graphically. The numerical tools provide the capability to quantify the large-scale picture of system performance and enable the analyst to identify opportunities for performance improvements. Reports can be exported to spreadsheet and slide presentation packages. The heart of the graphical depiction system is the Graphical Airspace Design Environment (GRADE), which provides users with an animated three-dimensional view of airspace and air traffic. GRADE graphics can be exported to slide presentation packages. The following Figure 2-1, shows the PDARS deployment locations as of this printing.

Figure 2-1 PDARS Deployment Locations

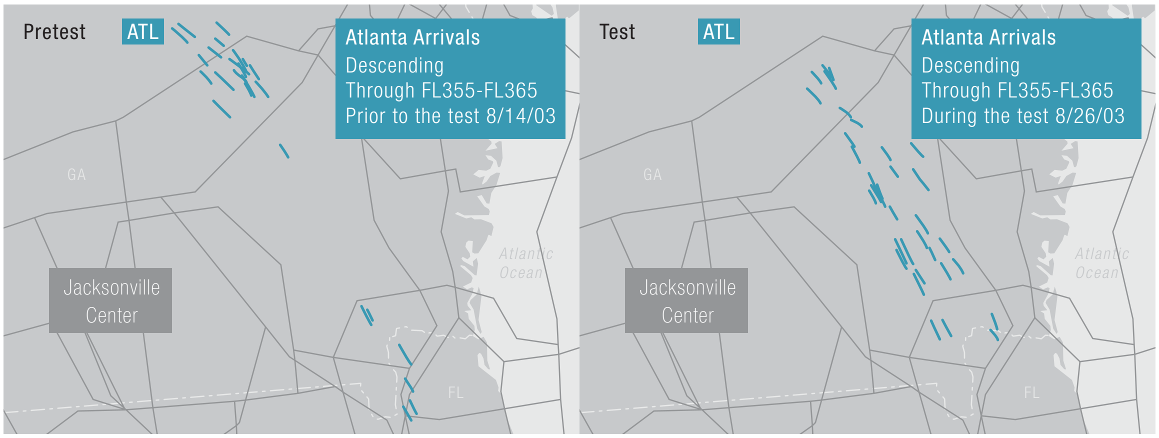


2.4.1 Jacksonville/Atlanta (LOA)

The PDARS\GRADE system was utilized by Jacksonville Center to test and validate in a timely manner the impact of a revised operational procedure involving Atlanta Hartsfield International arrivals from the southeast. The interfacility negotiated Letter of Agreement (LOA) allows for Jacksonville Center to descend Atlanta arrivals to FL330 or lower, prior to handoff to Atlanta Center, providing traffic and workload permit. The descent of the Atlanta arrivals earlier allows Atlanta controllers to provide a more desirable descent profile.

Figure 2-2 is a GRADE graphic highlighting the location and flight track portion of Atlanta arrivals descending through FL355-FL365 within Jacksonville Center airspace using the pretest procedure. Note that the majority of the Atlanta arrivals shown are descended with this altitude stratum in the northwest portion of Jacksonville Center airspace. Figure 2-3 shows the location and flight tracking data for Atlanta arrivals using the test procedure. In comparing the "before and after" operation, GRADE graphics in Figures 2-2 and 2-3 clearly illustrate Jacksonville Center controller's were able to descend more Atlanta arrivals earlier using the test procedure, and provided a more advantageous operation.

Figure 2-2 and 2-3 Proposed Arrival Procedure Modification

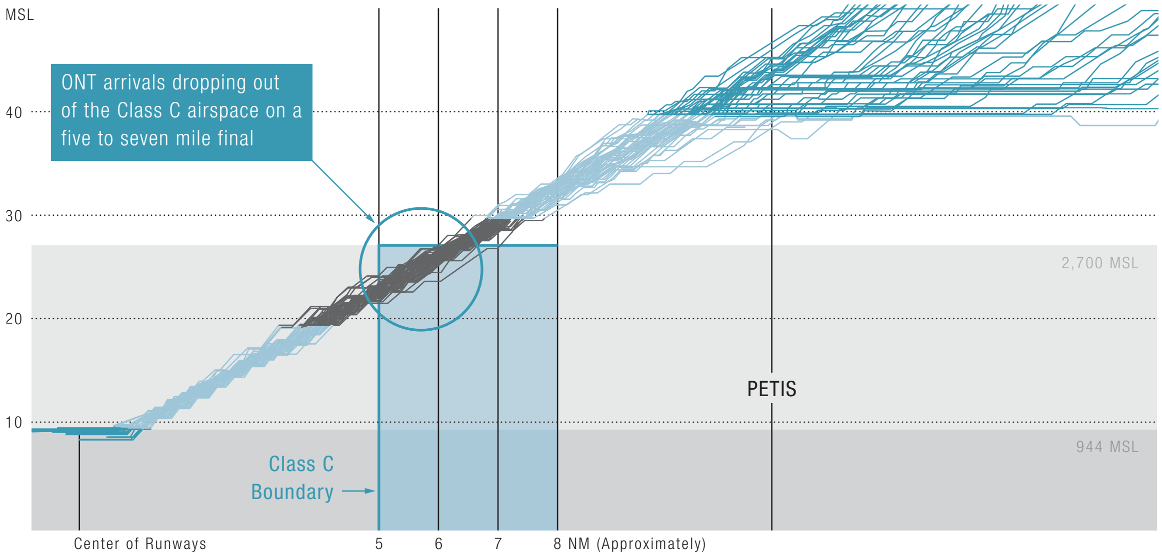


2.4.2 Ontario Class C Airspace Study

This study was commenced as a result of pilot reports indicating that aircraft on the instrument approaches into Ontario International Airport were dropping out of the Class C airspace on both east and west operations. Of concern was the number of visual flight rules (VFR) aircraft navigating close to and around Ontario Class C, and with the possible conflictions that this situation might create. The Southern California TRACON (SCT) Airspace Planning Office was directed to investigate this situation and used the PDARS\GRADE system to examine just how Ontario arrival, departure, and over flight aircraft interact with the Class C airspace and to determine if a Class C extension was necessary.

Figure 2-4 shows one of the GRADE graphics produced during this study and illustrates that Ontario International Airport arrivals under west plan do indeed leave and return to Class C airspace. This egress and ingress generally occurs five to seven miles from the airport while on final approach. The graphic in Figure 2-4, as well as other PDARS/GRADE data, was used in this study as a tool in collaborating with adjacent facilities to implement interim procedural changes, and for development of airspace design improvements. An extension to the Class C has been proposed as a result of these efforts.

Figure 2-4 Ontario International Airport Arrivals Exiting

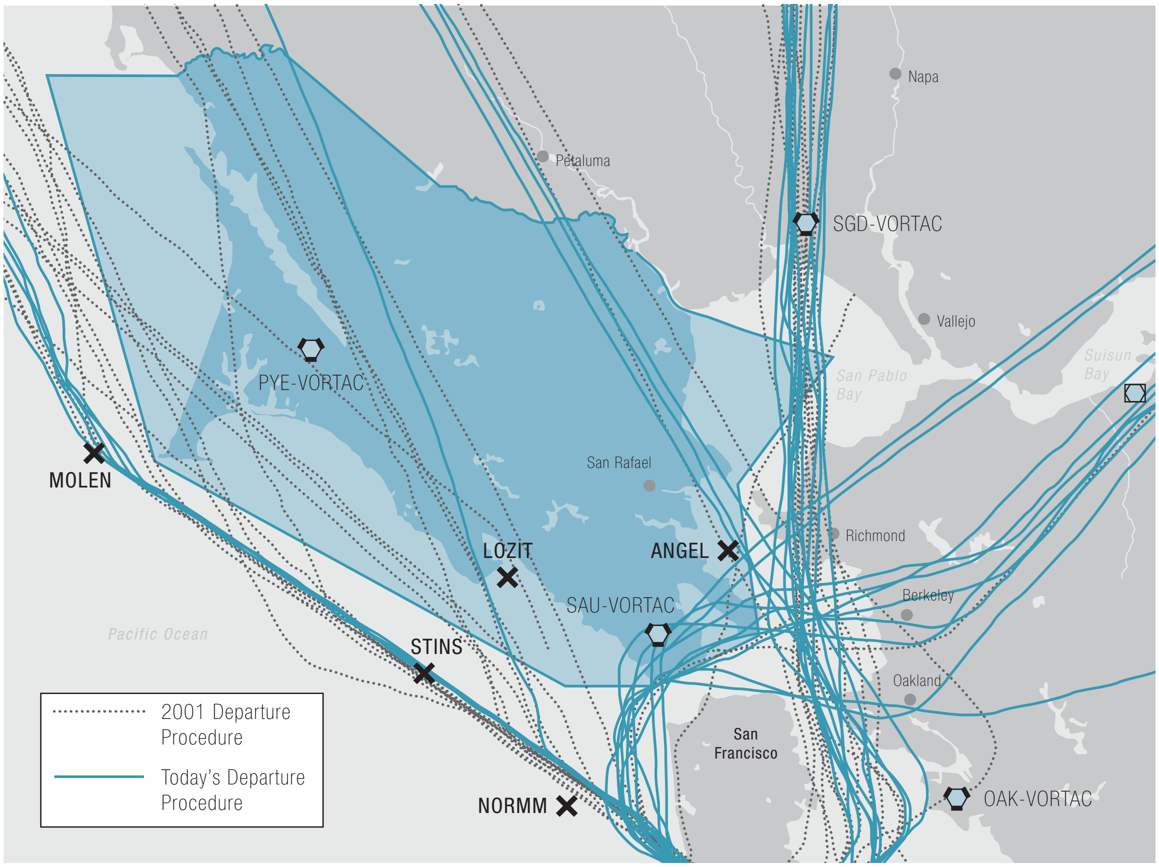


2.4.3 SFO MOLEN Departure Procedure Analysis

The MOLEN Standard Instrument Departure (SID) calls for aircraft to cross the MOLEN intersection, thereby remaining over the ocean for noise abatement purposes. In 2001, it was brought to FAA's attention that San Francisco Departures utilizing the MOLEN SID were at times being expedited prior to reaching MOLEN intersection. This non-standard departure routing was permitted during the day, but was not to be used at night because it would cause flights to fly over the Point Reyes National Sea Shore. Bay TRACON (now part of the new Northern California TRACON) was requested to evaluate the problem and determine if flights were in fact being re-routed during nighttime operations. To accomplish this task, the PDARS/GRADE system was used to analyze the SFO MOLEN Departure Procedure and to determine the extent of compliance with the nighttime restriction.

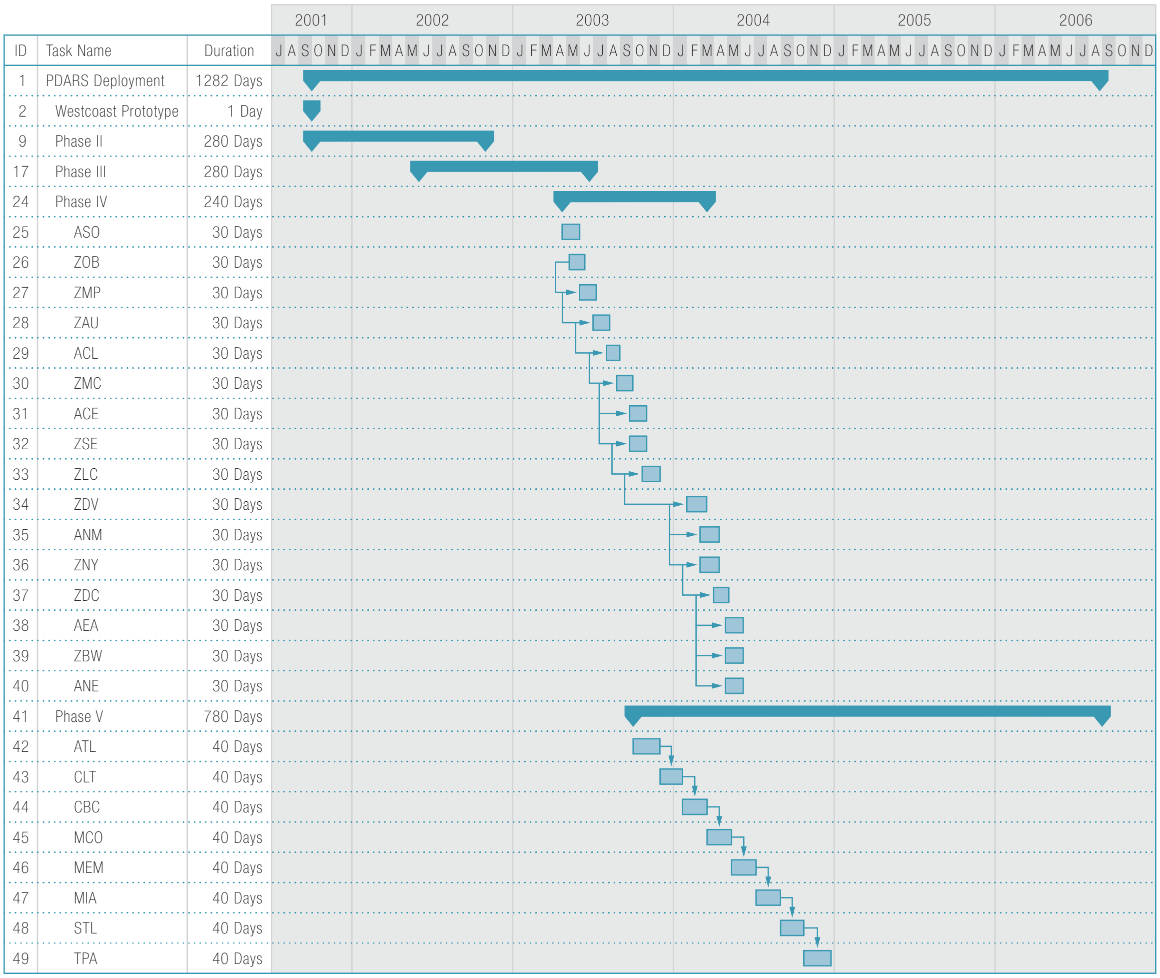
In Figure 2-5, the SFO departure flights depicted as dotted lines are flight tracks as flown in 2001. Note that several of these flights cross land in the vicinity of the Point Reyes VORTAC (PYE). As a result of the initial PDARS/GRADE analysis, FAA re-emphasized to controllers that compliance with the SID was mandatory during nighttime operations. A follow-on analysis was conducted by Northern California TRACON. The flights depicted as solid blue lines, are SFO departures from 2003 and are representative of current operations. Note, all but one flight are in compliance with the MOLEN Departure Procedure and that the expedited flight it turns out was vectored during the daytime. Figure 2-5 and additional PDARS\GRADE data were presented in briefings requested by the public. Use of this information was essential in assuring the public that the SFO MOLEN Departure Procedure was being followed.

Figure 2-5 SFO MOLEN



PDARS is typically put to work almost immediately after its installation. PDARS will be deployed at all 20 domestic Air Route Traffic Control Centers (ARTCCs) and several Terminal Radar Approach Control Facilities (TRACONs) by the end of CY 2004. Figure 2-6 gives the timeline for PDARS deployment that will occur within five phases planned for completion in 2006.

Figure 2-6 PDARs Deployment Timeline



2.5 Delays in the National Airspace System

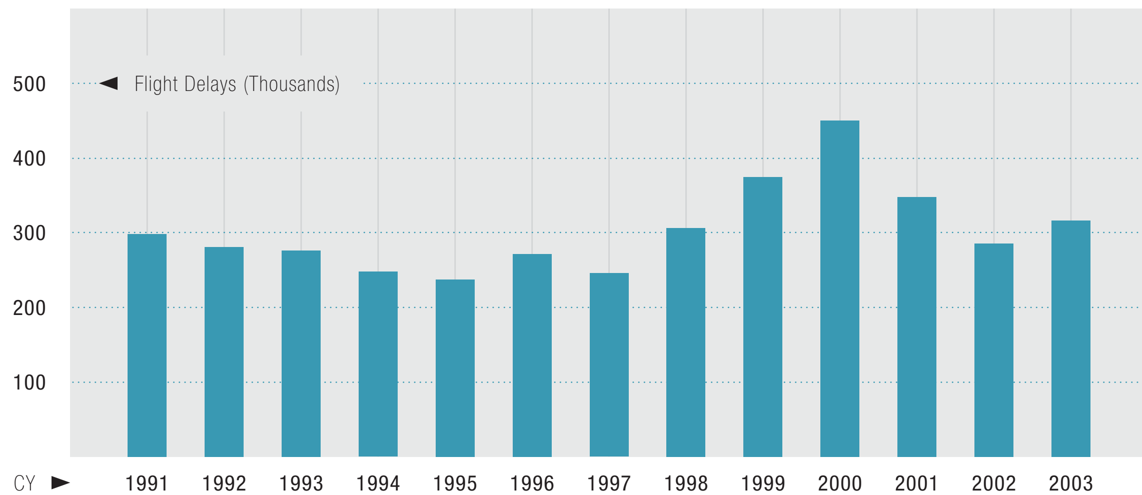
Delay is the traditional measure of NAS performance, but it is not a straightforward measure to calculate for an individual flight, airport, or for the entire system. There are many delay parameters that can be (and are) tracked.

By any measure, indications of a recovery in air traffic are evidenced by the increase in delays by year end 2003, which ended the trend of a significant decrease in delays that occurred between 2000 and 2002. Traffic continues to recover at an uneven rate throughout the system, as many of the largest airports have been operating at or near their theoretical capacity. As observed in prior years, a small increase in the number of operations at certain airports produce a disproportionate increase in the number of delays.

2.5.1 Delays Reported by the Operations Network

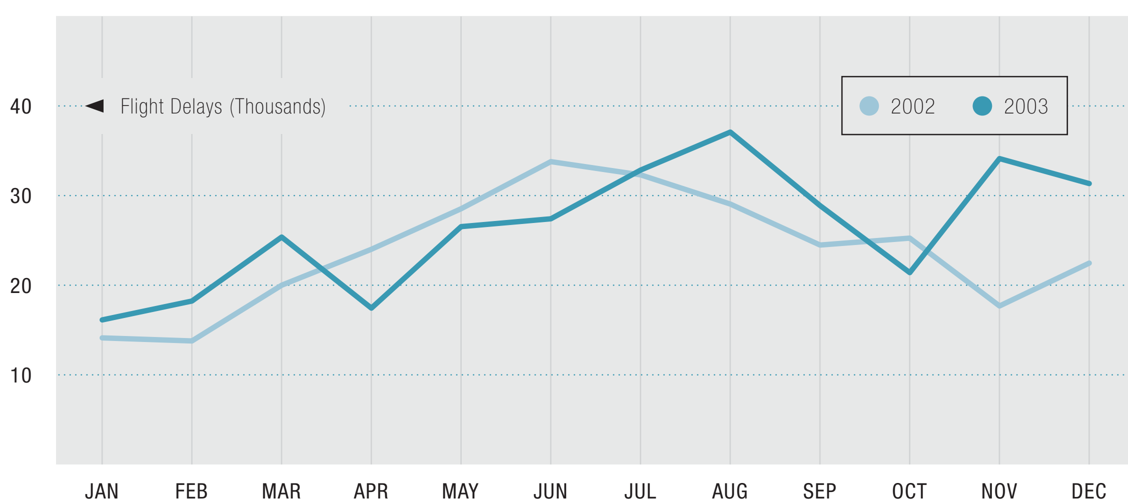
In December 2003, the DOT and FAA expanded its monthly report on airline service, to include reasons for flight delays. This information may be accessed on the Web at www.bts.gov under the Aviation Information Header, see "Airline On-time Performance and Causes of Flight Delays." The FAA reports the delay performance of the NAS every month, using data derived from OPSNET. OPSNET data is generated from observations by FAA personnel, who record only the aircraft that are delayed by 15 minutes or more during any phase of flight. According to OPSNET data 316,888 flights were delayed by 15 minutes in CY 2003, an increase of 31,239 or 10.9 percent from the 285,649 delays in CY 2002. Figure 2-7 shows flight delays for the years for which OPSNET data are available.

Figure 2-7 Annual Flight Delays CY 1991-CY 2003



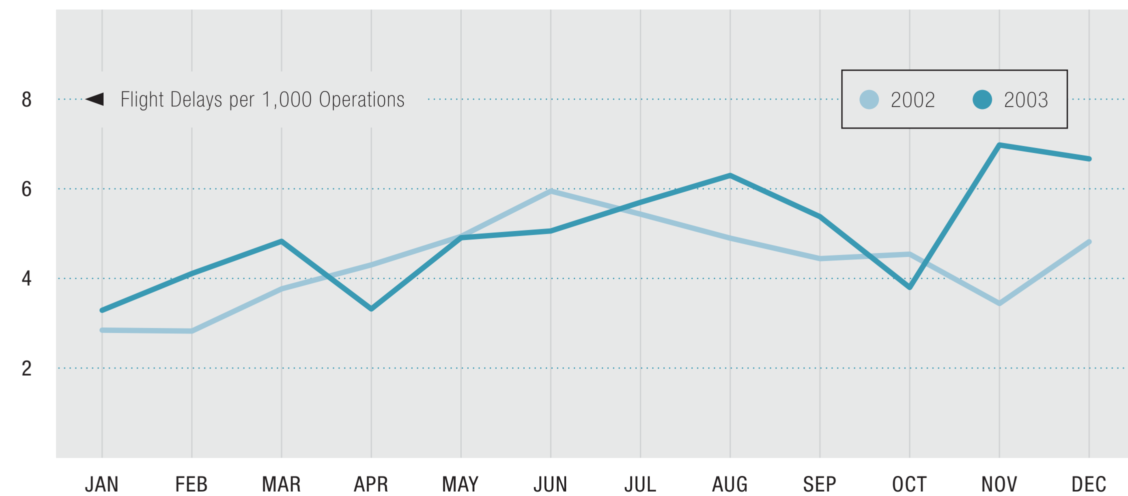
Eight of the months in 2003 had higher delays than the corresponding months of 2002, some significantly higher. As traffic continues to recover, more delay can be expected without increases in capacity. Figure 2-8, highlights the changes in delay by month between CY 2002 and CY 2003.

Figure 2-8 Flight Delays by Month, CY 2002 and CY 2003



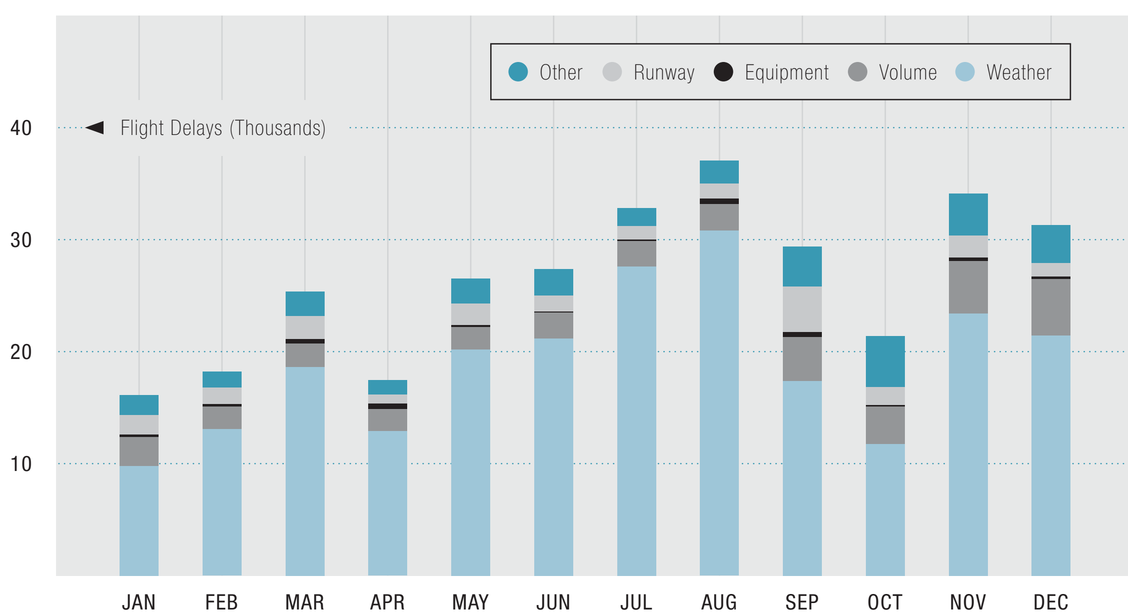
The total number of aircraft operations during the same period was down by only 0.3 percent. Thus, the rate of delays increased as well as the absolute number of delays. Figure 2-9 shows the number of delays per 1,000 aircraft operations, by month, for 2002 and 2003.

Figure 2-9 Flight Delays per 1,000 Operations by Month, CY 2002 and 2003



One of the most valuable aspects of the OPSNET system is that it attributes each delay to one of several causal factors: weather, traffic volume, NAS equipment outages, closed runways, and other causes. The primary causes of delay have varied little year over year, with a large majority of delays attributed to weather (from 65 to 75 percent) and a smaller but significant percentage to traffic volume (12 to 22 percent.) Figure 2-10 shows the distribution of delays by cause for CY 2003.

Figure 2-10 Flight Delays by Cause CY 2003



In response to numerous inquiries in 2002, the FAA began tracking ground delays throughout the NAS. Ground Delay Programs are implemented to control the volume of air traffic to airports where the projected traffic demand is expected to exceed the airport's acceptance rate for a lengthy period of time. The determination that delays are expected to be long lasting rather than temporary is based on the evaluation of weather conditions, forecasts, and projected demand.

The most common reason for the imposition of a Ground Delay Program is the reduction of the airport's acceptance rate, most often because of adverse weather conditions such as low ceilings and visibility. There were 107,841 ground delays recorded in CY 2003, an increase of 28,537 or 36 percent from the previous year's 79,304.

2.5.2 The Aviation System Performance Metrics System

The Aviation System Performance Metrics System (ASPM) was originally developed on a cooperative basis by the FAA and nine air carrier members of the Air Transport Association to measure performance of the NAS by individual flight by phase of flight on a next day basis. Currently, 22 air carriers report flight data for flights to and from 55 airports.

ASPM integrates daily data from two primary sources: the Enhanced Traffic Management System (ETMS) and Out, Off, On, and In data from ARINC. In addition, data are included from the Official Airline Guide (OAG), and monthly carrier filings under 14 CFR Part 234, *Airline Service Quality Reports*, with the DOT.

In 2002 the FAA and DOT jointly agreed a flight was delayed if it arrived at the destination gate 15 minutes or more after its scheduled arrival time. In June 2003, air carriers required to file data under Part 234 for delayed flights began to provide data indicating the cause of such delay in five categories: carrier caused, weather, NAS, security, and late arriving flights. These data are maintained in ASPM, along with a separate breakdown of what carriers identified as NAS caused delays into the same categories that are reported in OPSNET, using information contained in OPSNET.

The ASPM database is the primary data source for the many of the FAA's operational performance metrics in the FAA's Flight Plan, issued in September 2003. Most of these metrics are limited to data for flights to and from the OEP 35 airports. Primary metrics include the percent of flights on-time, airport arrival capacity at the 35 OEP airports, airport arrival capacity at eight congested metropolitan areas, and airport arrival efficiency.